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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,404	05/18/2005	Arnaud Favier	123956	5998

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EXAMINER
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BERNSHTEYN, MICHAEL

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 11/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/535,404

Applicant(s)

FAVIER ET AL.

Examiner

Michael Bernshteyn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☒ Claim(s) 18,19,21,27 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 07/07/05,10/13/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 18, 19, 21 and 27 are objected to because of the following informalities: the use of the phrases "preferably", "more preferably", "in particular" to link a broad range of values with a narrow range of values renders the claims awkward and not in compliance with the current US practice. It is not clear which range controls the actual metes and bounds of the claimed subject matter. It is suggested to put preferable range in the dependent claims. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 16-24 and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable as obvious over Le et al. (US Patent Application Publication 2004/0171777).

With regard to the limitation of instant claims 16 and 29, Le discloses a free radical polymerization process, selected chain transfer agents employed in the process and polymers made thereby, in which the process comprises preparing polymer contacting: (i) a monomer selected from the group consisting of vinyl monomers; (ii) a thiocarbonylthio compound; and (iii) free radicals produced from a free radical source; and controlling the polydispersity of the polymer (abstract).

Le discloses that in conventional free radical polymerization, polydispersities (the polydispersity is defined as the ratio of the weight average and number average molecular weights) of the polymers formed are typically in the range 1.6-2.0 for low conversions (<10%) and are substantially greater than this for higher conversions. Polydispersities of Le's polymers usually less than 1.5, often less than 1.3,

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and may be less than 1.1. The low polydispersity can be maintained at high conversion (page 7, [0088]). **Benzyl dithiobenzoate** and its derivatives are preferable chain transfer agents in polymerization of styrene or acrylate esters page 8, [0115]). The polymerization process is performed under the conditions typical of conventional free radical polymerization and is suitably carried out with temperatures during the reaction in the range  $-20$  to  $200^{\circ}\text{C}$ , preferably in the range  $40$ - $160^{\circ}\text{C}$  (page 10, [0128]).

Le discloses the preparation of low dispersity poly(N,N,-dimethylacrylamide) using benzyl dithiobenzoate (Example 34 and Table 10, page 18, [0200]). The polymerization temperature was  $60^{\circ}\text{C}$  and duration was 1 hour. If number average molecular weight of the polymer is equal to 135,000 (entry 2 in the table 10), the polydispersity is equal to 1.23, and if number average molecular weight is equal to 224,000 (entry 3 in the table 10), the polydispersity is equal to 1.44.

When the claimed range and the prior art range are very similarly (i.e., less than 1.2 and 1.23, and less than 1.4 and 1.44), the range of the prior art establishes *prima facie* obviousness because one of ordinary skill in the art would have expected the similar ranges to have the same properties. See *In re Peterson*, 65 USPQ2d 1379, 1382, citing *Titanium Metals Corp. V. Banner*, 227 USPQ 773, 779. Furthermore, the disclosure by the reference of a preferred embodiment does not teach away from the entire disclosure of the patent, all of which must be considered in the analysis of obviousness. See *In re Burckel*, 201 USPQ 67, 70.

With regard to the limitation of instant claims 21 and 27, Le discloses that specific monomers or comonomers include **methacrylamide**, N-methylacrylamide, N,N-dimethylacrylamide, N-tert-butylmethacrylamide, etc. (page 5, [0073]).

With regard to the limitation of instant claims 22 and 28, Le discloses the preparation of **tert-butyl dithiobenzoate** in procedure 6 of example 8 (page 13, [0156]-[0160]).

With regard to the limitation of instant claim 23, Le discloses thermal initiators which have an appropriate half life at the temperature of polymerization, including **2,2-azobis(isobutyronitrile)**, 2,2-azobis(2,2,4-trimethylpentane), etc. (page 4, [0065]).

With regard to the limitation of instant claims 17-20, 24 and 26, Le does not disclose that the control of the flux of initiator radicals is achieved by maintaining a uniform polymerization temperature  $T_1$  during the initiation period, and continuing the polymerization, the polymerization temperature being allowed to fall to the temperature  $T_2$ . The claim 17 recites the difference between two polymerization temperatures, such as  $T_1 - T_2 \leq 50^\circ\text{C}$ , which means that the difference between these two temperatures can be negligibly small, and the criticality of maintaining such difference is not shown in the instant disclosure. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to maintain the close temperatures during initiation and polymerization period and to adjust the temperatures depending on the nature of initiator and desired polydispersity and molecular weight. It is noted that the temperature of polymerization is a result effective variable, and therefore, it is within the skill of those skilled in the art to find the optimum value of a result effective variable, as

per *In re Boesch and Slaney* 205 USPQ 215 (CCPA 1980): Discovery of optimum value of a result effective variable in known process is ordinarily within the skill in the art and would have been obvious.

2. Claims 25 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Le as applied to claims 16-24 and 26-29 above, and further in view of Takaki et al. (US Patent 6,359,093).

With regard to the limitation of instant claims 25 and 30, Le does not disclose the initiating agent 2,2-azobis (2,4-dimethylvaleronitrile) and acryloylmorpholine.

With regard to the limitation of instant claim 25, Takaki discloses that the azo compound initiators include **2,2-azobis (2,4-dimethylvaleronitrile)** (col. 23, lines 63-64), **azobis(isobutyronitrile)** (col. 24, line 14), and etc. Therefore, these initiators belong to the same class of azo compound initiators; they are functional equivalent and can be substituted with each other.

With regard to the limitation of instant claim 30, Takaki discloses that the examples of unsaturated carboxylic acid amid compound include acrylamide, methacrylamide, **N-acryloylmorpholine**, etc. (col. 21 line 66 through col. 22, line 17).

Therefore, these compounds belong to the same class of acrylamide; they are functional equivalent and can be substituted with each other.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to employ initiator 2,2-azobis (2,4-dimethylvaleronitrile) as functional equivalent of azobis(isobutyronitrile) and monomer acryloylmorpholine as

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functional equivalent of acrylamide as taught by Takaki in Le's process for controlled radical polymerization in order to obtain polymers with low polydispersity.

Thus, the combination of Le and Takaki renders the instant claims *prima facie* obvious absent evidence of unexpected results commensurate in scope to the claims.

### **Conclusion**

Other references used but not cited in this office action include U.S. Patents 6,765,078, 6,858,309, 6,359,093, 5,723,344, 4,279,795, US-2004/0171777, US-2004/0110893, US-2003/0139553, US-2004/0091451, JP 62149746, JP 62187756 and JP 2002-2338817 are shown on the Notice of References Cited Form (PTO-892).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Bernshteyn whose telephone number is 571-272-2411. The examiner can normally be reached on M-F 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.




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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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